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DEPARTMENT
EDUCATION ALBERTA

HIGH SCHOOL ENTRANCE EXAMINATIONS BOARD

DEPARTMENTAL EXAMINATIONS, 1965

GRADE IX

MATHEMATICS

Time — 2 hours.

DO NOT SPEND TOO MUCH TIME ON ANY ONE QUESTION.
READ THE QUESTIONS CAREFULLY.

Total Possible Mark — 173.

Finished work in this booklet may be done in either pencil or ink (blue or black).

For the first 18 questions, five solutions are given for each question, only one of which is correct. You are to circle the NUMBER of the correct answer with a pencil or pen.

From question 24 to the end of the paper partial marks will be given for correct method. For this reason all work should be shown in the space provided for the solution. NO MARKS WILL BE GIVEN FOR WORK IN THE SPACE MARKED "FOR CALCULATION".

When making constructions be sure to leave all construction lines in your diagram. DO NOT ERASE THEM. They indicate to the marker just how the construction was done.

DO NOT FOLD THE TEST BOOKLET.

Place your test booklet in the envelope in such a way that the UPPER LEFT HAND CORNER OF THE BOOKLET (Candidate's Number) shows through the SLASHED CORNER of the answer envelope.

(For the use of Sub-Examiners only)

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Values

2 marks each

SECTION A

With a pencil or pen, circle the NUMBER of the correct answer in each of the following 18 questions. An example is:

The product of 6 and 9 is

1. 15 2. 69 [✓ 3.] 54

4. 96 5. 3

Since the correct answer is 54, the NUMBER 3 has been circled.

1. $\dfrac{\frac{4}{9}}{\frac{5}{6}} =$

1. 1. $\frac{10}{27}$ 2. $\frac{8}{15}$ 3. $\frac{3}{5}$

4. $1\frac{5}{8}$ 5. $\frac{5}{7}$

2. $(1.02)^3 =$

2. 1. 1.0404 2. 1.061208 3. 10.404

4. 3.06 5. 10.61208

3. The L.C.M. of 24 and 36 is

3. 1. 60 2. 864 3. 12

4. 6 5. 72

4. If $A = 4\pi r^2$, then $\pi =$

4. 1. $\frac{A}{4\pi r}$ 2. $\frac{4r^2}{A}$ 3. $\frac{A}{4r}$

4. $\frac{A}{4r^2}$ 5. $\sqrt{\frac{A}{4r^2}}$

5. If $2x - 4 = 14$, then $x =$

5. 1. 9 2. 5 3. 7

4. $3\frac{1}{2}$ 5. 10

6. If $\frac{6n}{5} = 12$, then $4n =$

6. 1. 8 2. 10 3. 24

4. 15 5. 40

FOR CALCULATION

(No marks given for work in this space)

Values

7. The edge of a closed cubical cardboard carton is $4s^2$ inches. The area of its surface in square inches is

7. 1. $96s^8$ 2. $64s^6$ 3. $96s^4$
4. $48s^6$ 5. $48s^8$

8. The numerical value of the product of $4x + 3y$ and $x + 2y$ when $x = 1$, $y = 2$ is

8. 1. 96 2. 15 3. 28
4. 50 5. 21

9. $M = \dfrac{a - b}{c}$
In the above formula if the value of c is halved, then the value of M is

9. 1. doubled 2. quartered 3. halved
4. tripled 5. unchanged

10. $\dfrac{(-3)^3\ (-4)^2}{-2^4} =$

10. 1. -27 2. -9 3. 27
4. 9 5. -54

11. If $4x + 2 = 9x - 13$ and $3y - 4 = 5y + 6$ then $x - y =$

11. 1. -2 2. 2 3. 8
4. -8 5. 15

12. What is the interest on \$3600 in x months at $y\%$? (Simple interest)

12. 1. \$3600xy 2. \$3xy 3. \$36xy
4. \$3 5. \$$xy$

13. When similar terms are combined
$5x - 7x + 3y - 5 - 3x - y + 3$
becomes

13. 1. $15x + 4y - 8$ 2. $-5x - 2y - 2$
3. $5x + 2y - 2$ 4. $5x - 2y - 2$
5. $-5x + 2y - 2$

FOR CALCULATION
(No marks given for work in this space)

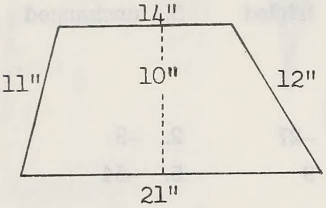
Values

14. Which formula suits the table shown?

n	1	2	3	4	5	7	10
p	5	7	9	11	13	17	23

14. 1. $p = n + 4$ 2. $p = 3n$
3. $p = 3n + 1$ 4. $p = 2n + 3$
5. $p = 4n - 1$

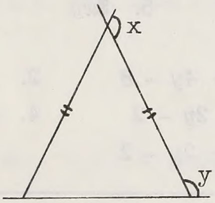
15.



The number of square inches in the area of the above figure is

15. 1. 210 2. 231 3. 350
4. 175 5. 105

16.



The triangle shown in the diagram is isosceles.
If $\angle x = 130°$
Then $\angle y = \quad ?°$

16. 1. 115° 2. 50° 3. 130°
4. 65° 5. 155°

FOR CALCULATION

(No marks given for work in this space)

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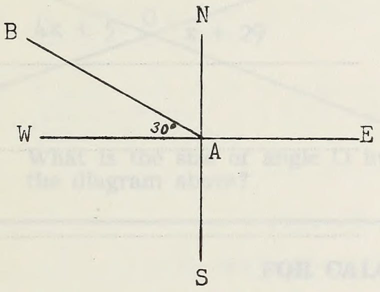
Values

17. A graph drawn from the table of values shown below would be a

x	0	1	2	3	4	5
y	0	2	5	10	17	26

17.
1. straight line graph
2. rectangular graph
3. bar graph
4. circle graph
5. curved line graph

18.



The bearing of *A* from *B* is

18.
1. N60°W
2. S60°E
3. W30°N
4. S30°N
5. N30°W

FOR CALCULATION

(No marks given for work in this space)

Values

SECTION B

19. Determine the answers to these questions. Place your answers on the lines provided.

2 (a) Simplify:

$2x(x + 3y) - x(x + y)$

2 (b) Simplify:

$$\frac{\frac{2}{3} + \frac{1}{5}}{\frac{3}{4} - \frac{1}{2}} =$$

2 (c) If $a = 3$ and $b = 4$, then

$(2a + 3b)^2$ is equal to

2 (d) What is the average of

+41, +34, –19, –12, +17, –25?

2 (e) Simplify:

$(5x^2 - 3xy + 6y^2) - (8x^2 - xy + 5y^2) =$

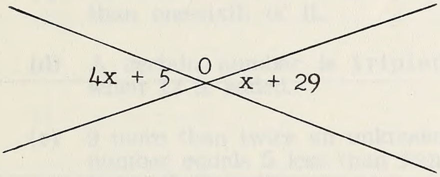
FOR CALCULATION

(No marks given for work in this space)

2 (f) If $\frac{1}{a} = \frac{1}{x} + \frac{1}{y}$,
find a when $x = 4$, $y = -5$ ....

2 (g) What sum of money invested at 6.5% per annum, simple interest, will yield $130.00 in one year? ....

2 (h)



What is the size of angle O in the diagram above? ....

FOR CALCULATION

(No marks given for work in this space)

Values

16 **20.** Fill in each blank with the correct word.

(a) A number that is divisible only by itself and unity is said to be ....

(b) The path traced by a point moving in a plane so that it is always a fixed distance from a fixed point is a ....

(c) A straight line joining opposite vertices of any quadrilateral is called a ....

(d) Two angles with the same vertex and a common line between them are ....

(e) A sum of money paid each year to keep an insurance policy in force is called the ....

(f) A closed broken line is called a ....

(g) If the sum of two angles is 180°, the angles are said to be ....

(h) A straight line forming a right angle with another straight line is called a ....

FOR CALCULATION

(No marks given for work in this space)

Values

5 **21.** Express algebraically, letting x represent the unknown. DO NOT SOLVE.

(a) The sum of twice a number and the square of that number. ....

(b) An unknown number is increased by 9 and the result is doubled. ....

(c) One-third of a number is 7 more than one-sixth of it. ....

(d) A certain number is tripled when 12 is added. ....

(e) 9 more than twice an unknown number equals 5 less than four times the number. ....

FOR CALCULATION

(No marks given for work in this space)

Values

14 **22.** Place your answers to the following questions in the spaces provided.

(a) $12\frac{1}{2}\%$ of \$728.24 = ...

(b) 27 is 6% of what number? ....

(c) $\sqrt[5]{32} \times \sqrt[3]{729} =$ ....

(d) The coefficient of ab in $16a^2bc$ is ....

(e) $12\frac{2}{3} \div 14\frac{3}{4} =$ ....

(f) Increase the product of 8.03 and 0.06 by the difference between 27.5 and 4.97 ....

(g) The *H.C.F.* of a^2b^2c, ab^2c^3 and a^2c^2 is ....

FOR CALCULATION

(No marks given for work in this space)

Values

12 **23.** State in its simplest form the value of each of the following:

(a) $7a^2b^3c \times a^2bc^3 =$ ....

(b) $\dfrac{4x^6y^2z^3}{12x^3y^3z^2} =$ ....

(c) $18 - (x + 18) =$ ....

(d) $4 \div 28 =$ ....

(e) $(+9) - (-3) =$ ....

(f) $-7 - (+5) =$ ....

(g) $-3 - (-6) =$ ....

(h) $-8 + (-6) =$ ....

(i) $\dfrac{42}{-7} =$ ....

(j) $\dfrac{-18}{-3} =$ ....

(k) $8(-6.5) =$ ....

(l) $.07 \times .005 =$ ....

FOR CALCULATION

(No marks given for work in this space)

Values

24. Solve the following problems. Place your answers on the lines provided.

3 (a) Find the value of r in the formula $V = \pi r^2 h$, when $V = 3564$, $h = 14$, $\pi = \frac{22}{7}$. Rearrange the formula as required before you solve.

....

2 (b) Combine into a single fraction reduced to its lowest terms:

$$\frac{3}{ab} - \frac{2}{bc} + \frac{1}{ac}$$

....

2 (c) Simplify:

$$\frac{a(a + 6)}{(a - 4)(a + 2)} \div \frac{b(6 + a)}{(a + 2)(a - 4)}$$

....

FOR CALCULATION

(No marks given for work in this space)

Values

2 (d) Simplify:

$$7r(4r^2 - 3) + 5r(-3r^2 - 6)$$

....

3 (e) Multiply:

$$\begin{array}{r} -8x + 2y \\ \underline{2x - 4y} \end{array}$$

....

3 (f) Subtract:

$$\begin{array}{rrr} -5a^2 & - \; 6ab & + \; 3b^2 \\ \underline{-4a^2} & \underline{+ \;\; ab} & \underline{+ \; 7b^2} \end{array}$$

....

3 (g) If $x = 2$ and $y = -3$, find the value of $4x^2y - 2x^3y^2 - 3xy^2$

....

FOR CALCULATION

(No marks given for work in this space)

[OVER]

Values

25. Solve the following equations and check your answers by substitution. All your work must be shown in the space provided.

2 (a) $6x - 8 = 2x + 4$ Check Here

1

3 (b) $2x(2x + 4) = 4(x^2 + 8)$ Check Here

2

4 (c) $\frac{7x - 3}{3} - 4 = \frac{3x}{2} + 5$ Check Here

2

FOR CALCULATION

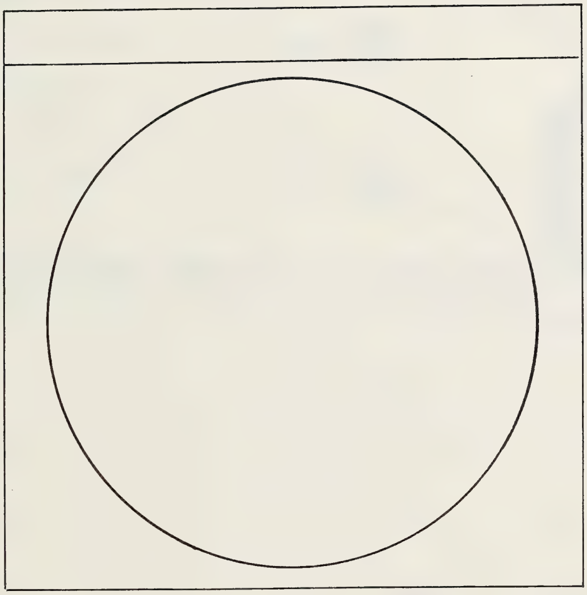
(No marks given for work in this space)

Values

8 **26.** (a) The following information represents the proportion of accidents that take place in various parts of school buildings:

Gym: 36%; Hall and Stairs: 20%; Class Rooms: 15%; Shops: 13%; Others: 16%.

Represent this information by a circle graph properly labelled.



1 (b) The number of accidents in the gym is how many times the number of accidents in the classrooms? ....

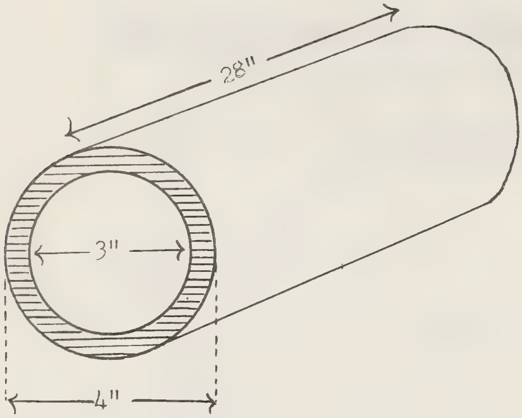
1 (c) The number of accidents in the shops is what per cent of the number of accidents in the hall and on the stairs? ....

FOR CALCULATION

(No marks given for work in this space)

Values

5 **27.** The illustration below shows a drainage tile. Calculate the volume of the material in the tile. Show your work. ($\pi = 3\frac{1}{7}$)

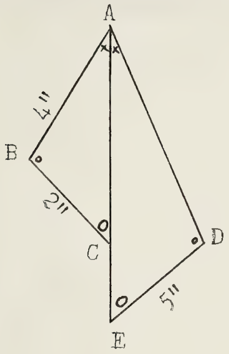


FOR CALCULATION

(No marks given for work in this space)

Values

28. (a) Triangles *ABC*, *ADE* are similar. Write the corresponding ratio for each of the following:



1 (1) $\frac{AE}{AD} =$

1 (2) $\frac{ED}{AD} =$

1 (3) $\frac{AE}{ED} =$

2 (b) If *AC* in the above diagram is 6", find the length of *AE* by calculation.

AE = ... inches.

2 **29.** Construct an isosceles triangle such that the sum of the equal sides is $3\frac{1}{2}$" and the angle contained by the equal sides is 68°.

FOR CALCULATION

(No marks given for work in this space)

Values

30. Using the ruler, pencil, and compass only, carry out the constructions asked for below. Be sure to show all construction lines and draw all arcs plainly.

2 (a) Construct an angle of 112½°.

2 (b) Construct an angle of 30°.

FOR CALCULATION

(No marks given for work in this space)

Values

4 **31.** A county council required $1,170,000 to meet the expenses for the year. The total assessed valuation of property was $18,000,000. What tax rate in mills had to be set to meet the expenses?

4 **32.** An auctioneer sold some goods, and kept a commission of 8% of gross sales for his services. If he turned over $8,832 to his employer, what was his commission?

FOR CALCULATION
(No marks given for work in this space)

Values

7 **33.** A truck leaves Calgary for Vermilion a distance of 320 miles, at 2:00 P.M. and averages 45 m.p.h. A car leaves Vermilion the same day for Calgary at 3:00 P.M. and averages 55 m.p.h. At what time would the two drivers meet for supper?

5 **34.** For long-distance calls a certain telephone company charges 40¢ for the first 3 minutes and 12¢ for each additional minute. For how many minutes was the phone used when the charges was $1.72? (An ALGEBRAIC solution is required.)

FOR CALCULATION

(No marks given for work in this space)

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